



RF



ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LXV NO. 5

PO Box 3454, Tustin, CA 92781

May 2024

The Prez Sez...

By Nicholas AF6CF



Hello! May is the month where we start finalizing the plans for Field Day, and we believe that all is almost ready. Several of our Club members have committed to the different positions and are now ready to be (more or less) expert FD operators. This month's speaker will have a sunny talk about our nearest star, and it should be really interesting, as its impact on radio communications is so important.

As mentioned, Field Day preparations are well under way, with only a couple of meetings to go and with great ideas and input from everyone. The Club's generator has been working flawlessly and now is time to think about the food. We still have a few positions still open, so hurry up to volunteer. The FD chair Ron W6WG is doing an excellent work organizing the event. He has secured a new site that promises to be even better than the last one. The Field Day activity is (among other things) an emergency preparedness drill, and as such it should not be at the same place with the same people and equipment every year. After the Baker to Vegas and Visalia events, I hope to get a first hand report at the next General Meeting from members that have participated. Don't forget the date change for the June meeting (a week earlier). We will be really busy this year with all this and more activities. I look forward to an eyeball contact with you all at the next General Meeting.

73 DE AF6CF

NEXT GENERAL MEETING

IN-PERSON

Ron Wilcox

KF7ZN

presents

"Visit to the Sun and the Ionosphere"

**May 17th, 2024, at 7pm
at the**

**American Red
Cross**

**Orange County Chapter
Santa Ana, Room 208**

NEXT BOARD MEETING

Saturday, June 1st, 2024

See www.w6ze.org for more info

In This Issue

The Prez Sez	1
Club Information	2
Speaker Spotlight, Ron Wilcox KF7ZN ..	3
VE Testing at OCARC	3
ARRL Field Day	4
RadioActivity	5
Tech Talk	6
Back to School at Cal State Fullerton ...	15
OCARC General Meeting Minutes	18
Treasurer's Report	20



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Monthly Events

Membership Meetings*

Time: 7:00 PM
When: 3rd Friday of each Month
Red Cross Orange County, Room 208
600 N Parkcenter Dr, Santa Ana
(Replaced by the Christmas Party in December.)

Board Meetings

First Saturday of each Month
Board will handle Club business now IN-PERSON.

Club Nets (Listen for W6ZE)

10M ~ 28.375 MHz SSB

Wed- 7:30 PM - 8:30 PM
Net Control: Corey, KE6YHX
Alternate Net Control: AJ, KN6WNO

2M ~ 146.55 MHz Simplex FM

Wed- 8:30 PM - 9:00 PM
Net Control: Corey, KE6YHX
Alternate Net Control: AJ, KN6WNO
Echolink Node: KK6TRC-L

75M ~ 3.883 MHz LSB

Tue @ 8:00 PM
Net Control: Corey, KE6YHX

Other Nets

**Catalina Amateur
Repeater Association (CARA)**
147.090 MHz (+0.600 MHz) No PL
Monday - Friday
9:00AM & 9:00PM
Prg. Director. Tom W6ETC
COME JOIN US

OCARC 2024 DUES:

*Membership period is:
1 January to 31 December*

Individual New or Renewal: \$30
Family New or Renewal: \$45
Teen New or Renewal: \$15

New Member Dues are prorated
quarterly and includes a badge:
Additional Badges¹ \$3

Use one of our interactive online forms
to calculate current prices, join, renew, or
order badges:

<https://www.w6ze.org/FormsShortcut.html>

¹ \$3 or less + mailing. See form.

“A Visit to the Sun and the Ionosphere”

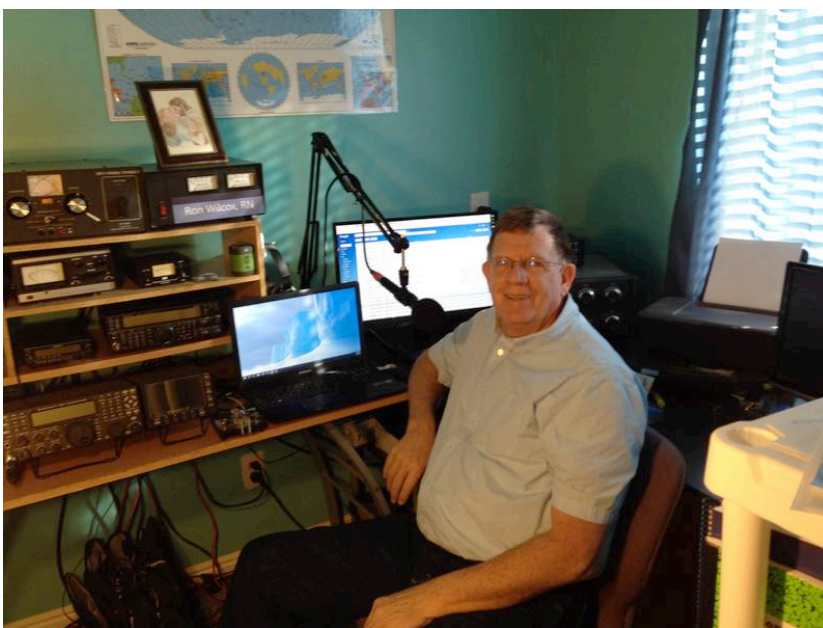
Our May Zoom presentation by Ron Wilcox, KF7ZN, is a basic introduction to the sun and its effect, and how the ionosphere works. We hear a lot of terms used in our hobby, such as sunspots, CME, K index, solar flux, F layer, etc., but what do they mean, and how can we understand them. What have been the effects of CME's that have struck the earth? These concepts are presented in an interesting format with the goal of helping us better understand their role. We will also touch on the recent eclipses and their effect. This is a non-technical aid in understanding more advanced presentations With Cycle 25 upon us, this will help in understanding its effects.

Licensed in 1984 thanks to Don KA7T, with a layoff from the hobby in the middle, Ron Wilcox KF7ZN had a career with Mountain Bell and is currently an RN nurse case manager with Intermountain Health/Select Health in Utah. He is a member and officer of organizations such as the Utah DX Association, Mobile Amateur Radio Awards Club, and HamSCI, among others. In trying to build and help the hobby Ron is active as a VE, serving on convention committees and ARES Assistant Emergency Coordinator. He is a member of the ARRL and HamSCI speaker's bureau, with frequent presentations at clubs and conventions. He has written articles for CQ, Spectrum Monitor and NCJ. You can check out his page on QRZ.com for more information.

Please join us Friday, May 17 at 7 PM at the American Red Cross, [600 Parkcenter Dr., Room 208, Santa Ana](#) to see the impact of the sun and the ionosphere on our hobby.

73 de Janet Margelli, KL7MF

VP-W6ZE/OCARC

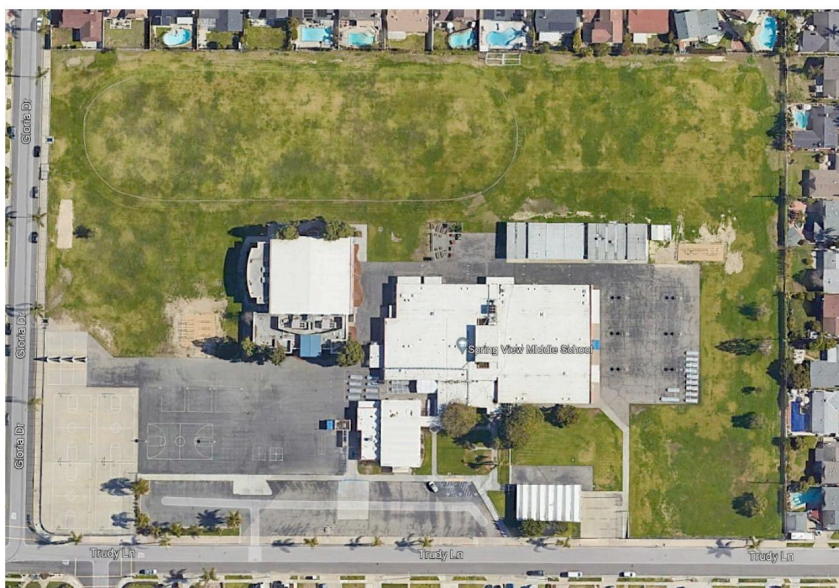


Breaking News VE Testing at OCARC

Starting at the June OCARC General Meeting VE Testing will be offered at 5:30pm prior to the General Meeting. Testing will be available for new ham licensing and upgrading of your current license.



ARRL FIELD DAY 2024



Spring View Middle School 16662 Trudy Lane, Huntington Beach, CA



Field Day 2024 is only a few weeks away, June 22 & 23. The biggest update for Field Day is we will be at a new site. We will be at the Spring View Middle School site in Huntington Beach. The site is large, about 950 feet long and 215 feet wide at its narrowest point.

Dino KX6D has volunteered his tower trailer, great news! Coming out to Field Day just to see that tower is worth the trip.

As always we can use everyone's help, "It takes a village" or in our case "an entire club" to make a really successful Field Day.

For newer members, Field Day is an excellent way to meet other members of the club and learn from those that have participated in many, many Field Days. Learn from the best!!

We plan on having the GOTA (Get On The Air) station up and running, so no excuses. GOTA contacts are worth 5 points each, so let's take advantage of all of our members, their families and friends by getting everyone on the air. Youth Participation is also a great source of bonus points.

For additional information contact Ron W6WG, w6wg@w6ze.org

RadioActivity

May 2024

Upcoming Activities:

May

- **His Maj. King of Spain Contest:**, CW 1200 UTC Saturday May 18 through 1200 UTC Sunday May 19
- **Baltic Contest:** 2100 UTC Saturday May 18 through 0200 UTC Sunday May 19
- ***CQ World Wide WPX Contest/CW:** 0000 UTC Saturday May 25 through 2359 UTC Sunday May 28

June

- *** **ARRL International Digital Contest:** 1800 UTC June 1 through 2359 UTC Saturday June 2
- **Asia-Pacific Sprint SSB:** 1100 – 1300 UTC Saturday June 8
- ***ARRL June VHF Contest:** 1800 UTC Saturday June 8 through 0259 UTC Sunday June 9.
- **ARRL Kids Day:** 1800 UTC through 2359 UTC Saturday June 15
- **ARRL Field Day:** 1800 UTC Saturday June 22 through 2100 UTC Sunday June 23.

* Indicates club entries are accepted

** Indicates team entries are accepted

Note: When submitting logs for ARRL Contests indicate your club affiliation as "Orange County ARC"

State QSO Parties:

- **Indiana QSO Party:** 1500 UTC Saturday May 4 to 0300 UTC Sunday May 5
- **Delaware QSO Party:** 1700 UTC Saturday May 4 to 2359 UTC Sunday May 5
- **New England QSO Party:** 2000 UTC Saturday May 4 to 0500 UTC Sunday May 5 and 1300 UTC Sunday May 5 to 2400 UTC Sunday May 5
- **Arkansas QSO Party:** 1400 UTC May 18 to 0200 UTC Saturday May 19
- **Kentucky QSO Party:** 1300 UTC Saturday June 1 to 0100 UTC Sunday June 2
- **West Virginia QSO Party:** 1600 UTC Saturday June 15 to 0400 UTC Sunday June 16

Repeating Activities:

- **Phone Fray** Every Tuesday night at 0230 UTC to 0300 UTC Wednesday
- **SKCC** Weekend Sprintathon (Straight Key CW) on the first weekend of the month after the 6TH of the month. 1200 Sat. to 2359Z Sunday.
- **SKCC** Sprint (Straight Key CW) 0000Z to 0200Z on the 4th Tuesday night (USA) of the month.
- **CWops** Every Wednesday 1300 UTC to 1400 UTC 1900 UTC to 2000 UTC and Thursday 0300 UTC to 0400 UTC
- **K1USN Slow Speed Test:** (CW, 20WPM Max.) Every Friday 2000 UTC to 2100 UTC. Every Sunday night at 0000 UTC to 0100 UTC Monday
- **ICWC Medium Speed Test:** (CW, 25 WPM Max.) Every Monday 1300 UTC to 1400 UTC

OCARC Club Nets:

- **75 Meter Net:** Every Tuesday night at 8:00 pm to 8:30 pm Local Time. SSB 3.883 MHz
- **10 Meter Net:** Every Wednesday night at 7:30 pm to 8:30 pm Local Time. SSB 28.375 MHz
- **2 Meter Net:** Every Wednesday night at 8:30 pm to 9:30 pm Local Time. FM Simplex 146.55 MHz

Other Nets:

- **Net-AT-9:** Wellness & Support Monday thru Friday 9:00 am and 9:00 pm Local Time 147.090 MHz (+600 MHz) No PL

Links:

[ARRL Contest Calendar](#)

[VOACAP Online for Ham Radio](#)

Send an email to Ron W6WG, w6wg@w6ze.org to have your favorite activity or your recent RadioActivity listed in next month's column.

Heathkit of the Month #123:
by Bob Eckweiler, AF6C



MISCELLANEOUS – AUTOMOTIVE

**Heathkit CI-1080
 Exhaust Gas Analyzer**

Introduction:

This article completes the triumvirate of Heathkit automotive test equipment that helped keep my 1971 sports car in tune for over 239 thousand miles (the average distance between the earth and moon). The other two are the previously covered ID-29 Automotive Tune-up Meter (HotM #73)¹ and the CI-1020 Automotive Timing Light (HotM #120)².

With California mandating smog inspections for post 1966 model year cars, an exhaust gas analyzer became almost a necessity for shade tree mechanics who did their own tune-ups. In the summer 1974 catalog, Heath introduced the CI-1080 Exhaust Gas Analyzer for \$59.95. One was purchased by mail order from Benton Harbor MI and arrived in mid-August (Shipping was \$2.48 for 6 lbs.).

The CI-1080 Exhaust Gas Analyzer:

The CI-1080 is based on a Fenwal G126B sensor. It mounts to a probe housing and stand that is placed on the ground near the car exhaust. A flexible metal tube connects to the probe housing, and its other end is in-



Figure 1: Author's Heathkit CI-1080 Exhaust Gas Analyzer purchased mail order in August 1974. (Apologies for the reflection on the meter face.)

serted into the car's tailpipe. A 21 foot, heavy three-conductor flat cable connects the probe to the instrument. There is also a power cable that has two large battery clips and connects to the automobile battery (or other 6 to 12 VDC source.)

As shown in **Figure 1**, the instrument, cables, probe with housing, pipe and stand, all fit in a blue molded plastic instrument case. The filled case weighs 4¾ lbs. and measures about 15¼" L x 8" W x 4¼" D". The carrying handle folds flush to the case when not being used.

By Christmas of 1975 the CI-1080 price had risen \$5 to \$64.95 The price increased at least eight times over its product's life, more than doubling from \$59.95 \$129.95. (See **Table 1**.)

The cost of the Fenwal sensor fluctuated over the years. No price was given in the early 595-

Here is a link to the index of Heathkit of the Month (HotM) articles:

http://www.w6ze.org/Heathkit/Heathkit_Index.html

1. Notes begin on page 13

CI-1080 SELLING PRICE OVER THE YEARS

CATALOG *	PRICE	
		A nickel short of:
Summer 1974	\$60	Introduced
Christmas 1975	\$65	
Christmas 1976	\$65	
Christmas 1977	\$65	
Winter 1978	\$68	
Winter 1979	\$70	
Christmas 1979	\$80	
Christmas 1980	\$80	
Christmas 1981	\$100	
Christmas 1982	\$115	
Christmas 1983	\$120	
Christmas 1984	\$120	
Christmas 1985	\$130	
:: ::	::	
Spring 1989	\$130	Last ap- pearedHeathkit

* See Note #3 on page 13

1675 manual; instead there was a note: "Write to Heath Co. for price information". At least four versions of the Fenwal sensor existed by 1984.

In 1989 Heath dropped the automotive section from their catalog. In the Winter³ and Spring 1989 catalogs, no automotive instruments are listed, with the exception of the CI-1080, which shows up in the "Home Products" section. Sometime between Spring 1989 and Winter 1990 the CI-1080 was also discontinued.

Table II shows the specifications, from the manual, for the CI-1080.

Operating the CI-1080 Analyzer:

The CI-1080 has only a center-zero meter and a balance control that is accessed on the back of the analyzer cabinet. Also on the back are feet. The two upper feet are hook

CI-1080 SPECIFICATIONS

Meter Scales (3) 11.5 – 15.0 Air Fuel Ratio.
70% – 90% Combustion Efficiency.
0 – 8% Carbon Monoxide.

Exhaust Type From 4-cycle gasoline engines.

Accuracy Within 1 Air-fuel Ratio depending fuel used.

Meter 4-1/2" 100–0–100 μ A 500 Ω .

Connections Battery Cord, 7 feet.
Sensor Cord, 21 feet
Exhaust flexible tube, 30 inches.

Power Requirements 6-volt or 12-volt car battery less than 150 mA.

Weight 4 lbs. 12 oz. (2.15 kg.)

TABLE II

shape so the cabinet can be hung on a partially open car window. Simple operating instructions are printed on the back. **Figure 2** is a view of the rear of the CI-1080 cabinet.



Figure 2: Rear cabinet view, showing balance control, hooked feet and simple instructions.

Before using, get the car warmed up, preferably by driving it until it reaches normal operating temperature. Be sure the car hood is open and the sensor assembly (**Figure 3**) is placed on the ground near the car exhaust. (Do not place the hose in the exhaust yet). Place the analyzer where the meter can easily be seen, and be sure the meter is mechanically centered. Now follow the instructions on the back of the analyzer cabinet:

1. **WARM ENGINE:** If the engine has cooled some during set up, let it run until it again reaches operating temperature.
2. **CONNECT BATTERY:** Connect the red and black alligator clips to the car battery (Either 6 V or 12 V can be used.) Observe polarity – the analyzer is protected against accidentally connecting the cables backwards.
3. **BALANCE METER:** Using the **BALANCE** potentiometer control on the rear of the analyzer cabinet, set the meter pointer to the 'Δ' calibration mark on the "AIR FUEL RATIO" (AFR) scale between 13.2 and 13.3. (**Figure 4**).
4. **INSERT PROBE:** With the engine idling, the flexible tubing should be inserted 6" to 12" into the tail pipe.

After the meter stabilizes read the relative air fuel ratio. Also note the combustion efficiency and percent CO (carbon monoxide.) at idle.

The test should be repeated with the engine running at cruising RPM, typically



Figure 3: Probe assembly, consisting of Sensor, Sensor cover, Probe Body, Knurled Collar, & Probe Stand. Also shown attached is the flexible tube.

2,000 RPM; but unless you have access to a dynamometer, this won't be as accurate as doing the test under load. **Figure 5**, from the manual, shows a typical setup.

CI-1080 Analyzer Assembly:

Construction of the CI-1080 is not difficult. It could be considered a one or two evening kit. Most components mount on a small circuit board (**Figure 6**); five precision resistors, two diodes, an internal calibration pot, an internal DPDT slide switch (**NORMAL – CALI-**

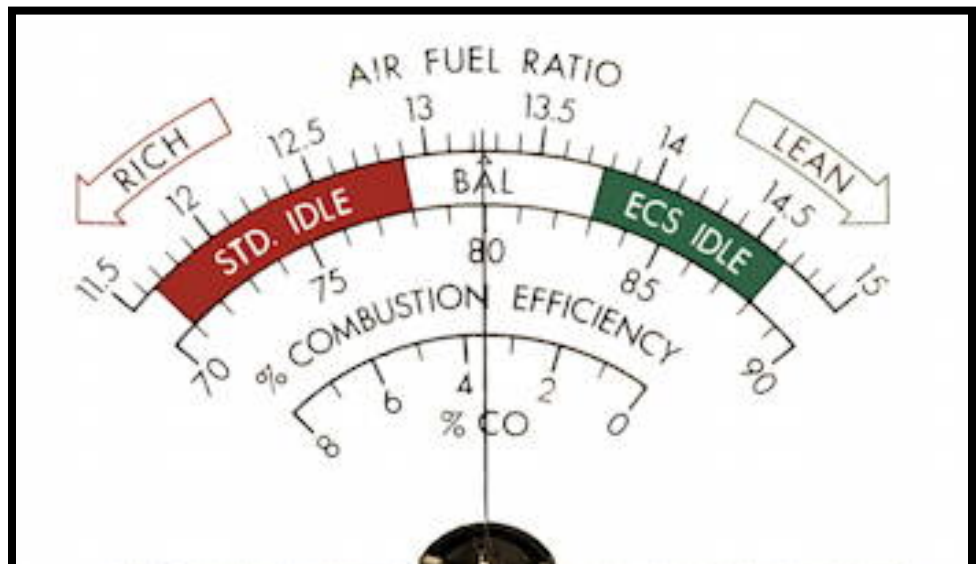
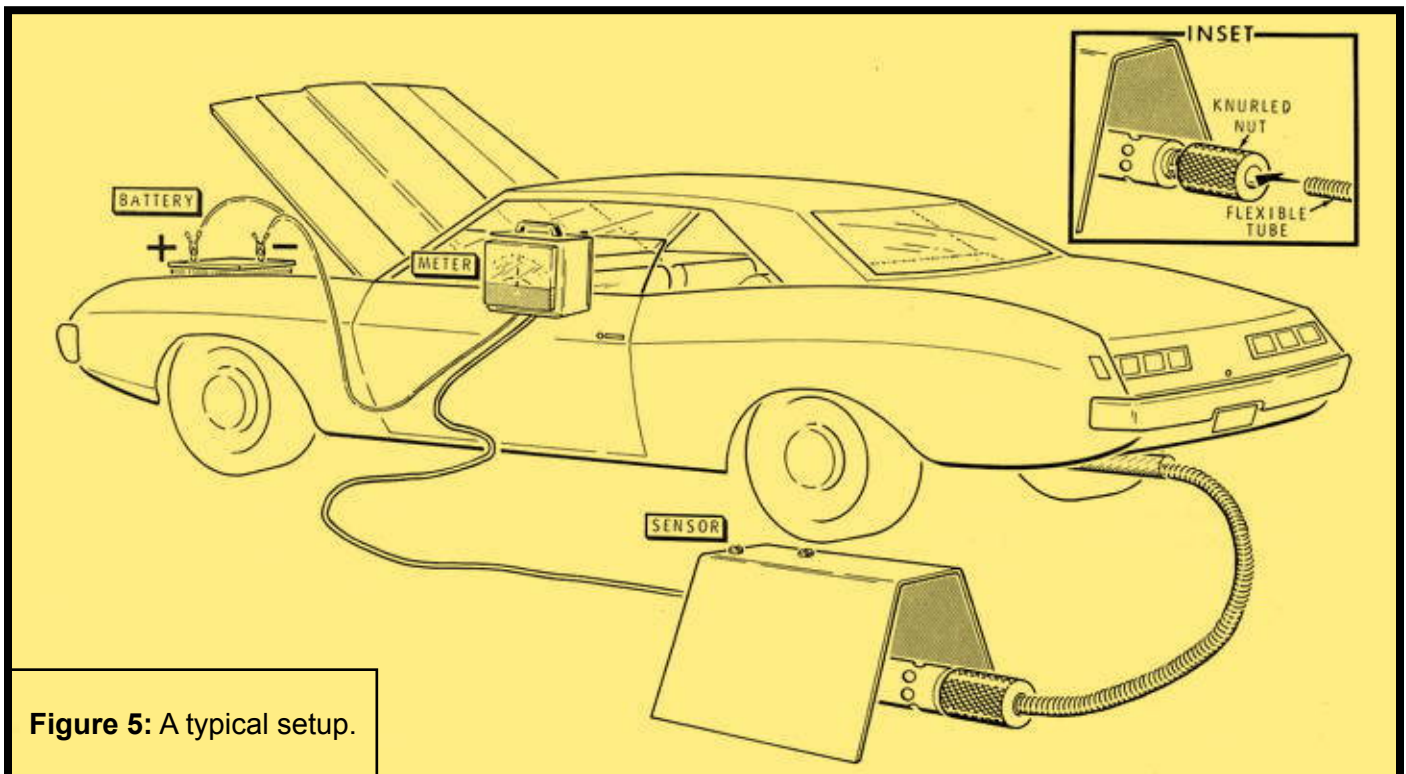


Figure 4: CI-1080 Exhaust Gas Analyzer Meter showing the three scales – Air Fuel Ratio, % Combustion Efficiency



BRATE), a lamp socket with a #53 lamp⁴ and the **BALANCE** pot. The balance pot mounts on the foil side of the circuit board. The completed circuit board is put aside, and the sensor probe assembly is constructed.

First, the sensor is bolted to the probe body, being sure the holes in each align. Then, a length of heavy, 3-conductor cord is soldered to the sensor, and the sensor cover is mounted over the connections, clamping the wires. Finally, the knurled collar is screwed onto the probe body and the assembled probe is attached to the U-shaped probe stand.

Assembly next focuses on the analyzer cabinet. The meter is attached to the cabinet⁵. One end of a length of heavy 2-conductor cord is prepared with battery clips, (black clip to the ribbed lead). The other end of the two conductor cord and the free end of the sensor cord are then stripped and tinned. Next, they are fed through holes in the cabinet and soldered to the circuit board^{6,7}. Both

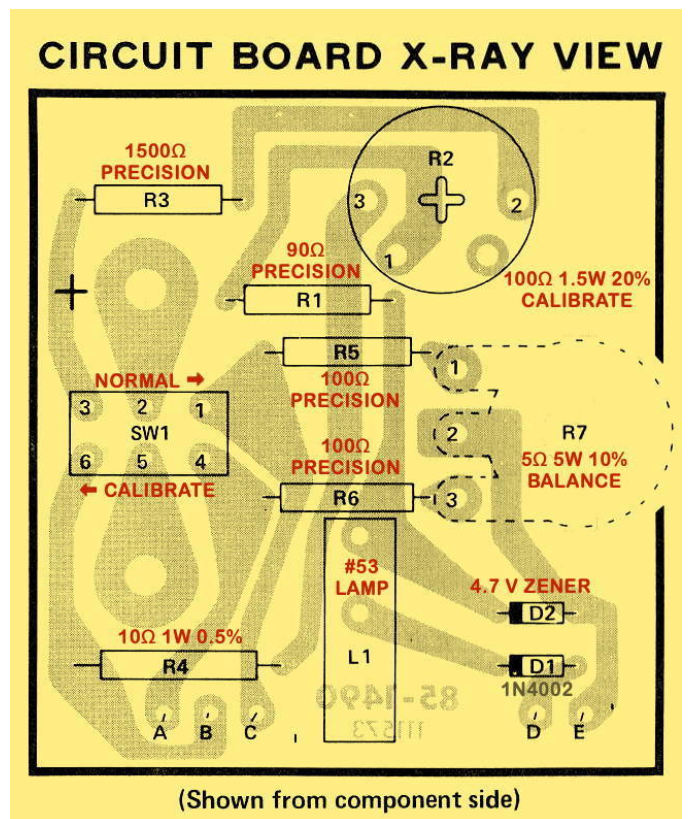


Figure 6: Author enhanced circuit board drawing from the manual. R7 (dashed) mounts on the foil side of the board. Large unused holes above and below SW1 fit the meter terminals. Plus is marked.

cords are secured to the cabinet using Heyco strain relief bushings, and the circuit board, component side up, is mounted to the meter terminals.

Following testing and calibration (next section), final assembly commences. The rear cover is prepared by adding feet, plastic mounting hooks, the handle and the blue and white identity label. It is then installed on the cabinet, being sure the **BALANCE** control shaft fits through the rear cabinet hole.

CI-1020 Testing and Calibration:

Testing –

1. Be sure the meter mechanical adjustment is set to the 'Δ' calibration mark.
2. Place SW1 in the **NORMAL** position,
3. Connect the power leads to a 6 or 12 volt car battery (red to positive.) The ballast lamp should light with a 12V battery and may light dimly with a 6V battery.
4. Turn the balance control R7 to be sure the meter can be adjusted well to both sides of the 'Δ' calibration mark.

This completes testing.

Calibration –

1. Move SW1 to the **CALIBRATE** position.
2. Adjust R2 until the meter reads 15 on the "AIR FUEL RATIO" scale.
3. Return SW1 to the **NORMAL** position.
4. Reset the meter needle to the 'Δ' calibration mark on the meter, if it has moved.

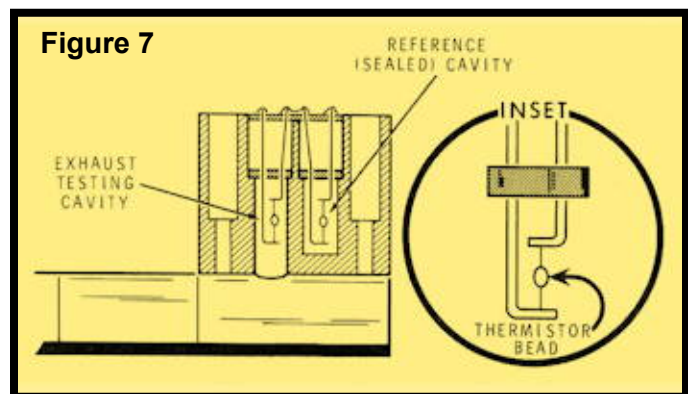
This completes calibration.

CI-1080 Analyzer Circuit Description:

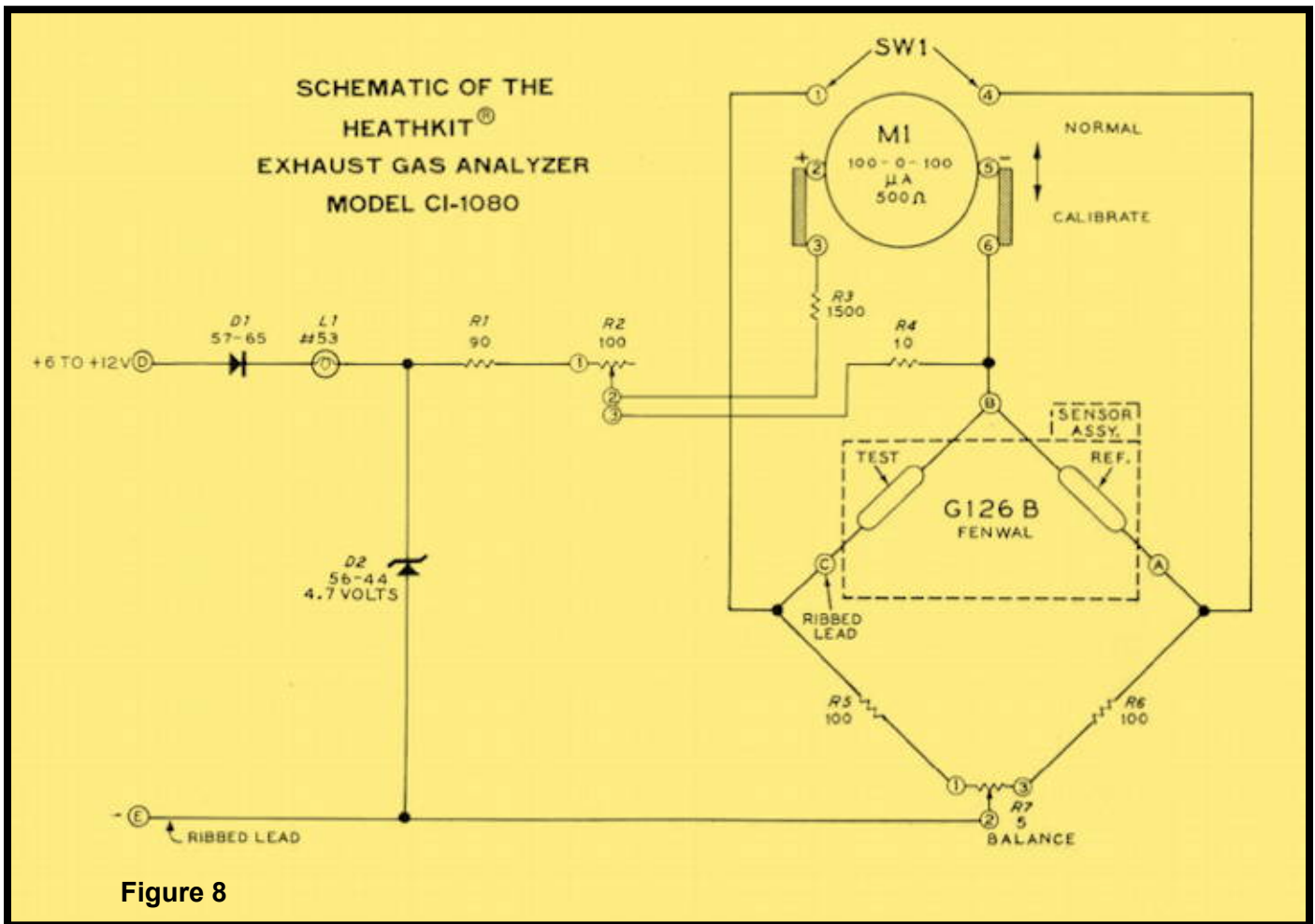
Refer to **Figure 8** for the schematic.

Power Conditioner: The power conditioning consists of D1, D2 and L1. It turns the 6V or 12V battery voltage into a regulated 4.7 volt source. D1 prevents damage, should the battery clips be connected backwards. Diode D2 is a 4.7V zener⁸. Lamp L1 acts as a ballast resistor. It will have higher resistance with 12 V input due to the added current draw causing the lamp to light moderately. The current draw will be a lot less with 6V causing the lamp to not light or just light dimly. In either case the output at the junction of L1 and D2 will be 4.7 volts.

Sensor: The Fenwal G126B sensor consists of a machined housing containing two well-matched tiny thermistor beads (**Figure 7**). One bead sits in a sealed, air-filled chamber; the other sits in a chamber open to the probe exhaust gas. Between the probe entrance and the open chamber are a series of baffles to make the gas that reaches the chamber be as static as possible, with little movement that can cause errors.



The tiny beads have a large negative temperature coefficient; their resistance drops quickly as they get hot: 2000 Ω at room temperature to 100 Ω at 150°C. When gas is introduced into the active cavity it changes the thermal conductivity of the atmosphere around the bead and causes its temperature, and thus resistance, to change.



The Bridge: The Wheatstone bridge, consists of the two sensor beads and two precision 100Ω resistors. A small balance potentiometer compensates for any slight differences in the bridge legs. The meter is connected between the center point of each leg. When power is supplied to the analyzer, 20 mA will flow through the bridge; 10 mA through each leg. The tiny beads will heat up quickly to around 150°C. Since they are well matched around that temperature, the meter may move significantly for a few seconds, as the sensor warms up, then settle near the center. It can then be balanced by the BALANCE control, if needed.

Exhaust gas varies in thermal conductivity from air. When exhaust gas is introduced into the chamber, the thermal conductivity of

the gas changes the temperature of the sensor bead. If the thermal conductivity of the gas is higher than air, the bead will cool, increase in resistance, and the meter will move to the left. However, if the thermal conductivity of the gas is lower, the bead will get hotter, decrease in resistance, and the meter will move to the right. An air fuel ratio of about 13.25 is close to the thermal conductivity of air.

The Calibration Circuit: The sensor is designed to output accurately when the bridge has 20 mA flowing through it (10 mA in each leg), and the beads have reached their operating temperature. Balance occurs when the active sensor is exposed to ambient air. Any slight imbalance can be corrected by the BALANCE control.

When SW1 is moved to the CALIBRATE position, the meter is switched to read the current into the bridge, and the output from the bridge is disconnected. **Figure 9** shows the circuit when SW1 is in the calibrate position.

The meter is connected in series with a precision 1500 Ω resistor (R3). They are connected between terminal 2 of potentiometer R2 and the top of the bridge circuit. R4 also sits across the same point, though it uses terminal 3 of R2 which is internally connected to terminal 2.

The meter's internal resistance is 500 Ω so, combined with the 1500 Ω series resistor, a voltage of 200 mV will cause the meter needle to move from center zero to + full scale. This is a simple Ohm's law calculation:

$$E = IR$$

$$E = 100\mu A (1500\Omega + 500\Omega)$$

$$E = 200mV$$

In order for the meter to reach full scale, enough current must be flowing through R4 to drop 200 mV across it. Again, using Ohm's law:

$$I = \frac{E}{R}$$

$$I = \frac{200mV}{10\Omega} = 20mA$$

The denominator should actually be 10 Ω in parallel with 2000 Ω (9.95 Ω) but the error (1/2%) is small and can be ignored.

Thus, when R2 is adjusted for full scale, (the meter needle at 15 on the air fuel ratio scale) the calibration is correct.

Comments:

Here are some items the user should be aware of:

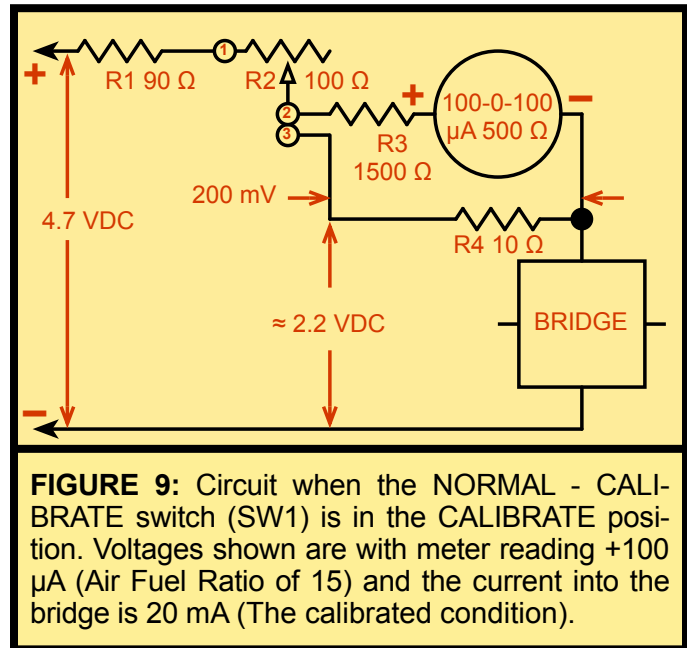


FIGURE 9: Circuit when the NORMAL - CALIBRATE switch (SW1) is in the CALIBRATE position. Voltages shown are with meter reading +100 μA (Air Fuel Ratio of 15) and the current into the bridge is 20 mA (The calibrated condition).

1. Carbon monoxide is deadly, make sure there is adequate ventilation .
2. Do not use with diesel vehicles or cars with 2-cycle engines, or cars that burn oil excessively. This can damage the sensor.
3. Cars with ECS⁹ should run and idle in the right side (LEAN), Older cars may read in the left side when idling, but move to the right side when the engine speeds up.
4. Readings above the stoichiometric value of most efficient combustion (14.7 AFR) are not reliable.
5. The CI-1080 is not intended for use with Chrysler "Lean Burn" engines.
6. Technical Exchange Bulletin CI-1080-1
Warning: When the EGR valve is removed, be sure to stay clear of the engine compartment; rapid deceleration can cause engine backfire.

The CI-1080 proved to be a useful instrument. It can tell you when you need to tune up your vehicle and add confidence when you are due to visit the smog test facility.

In the next installment of HotM, I hope to get back to some amateur equipment.

Recently an SBA-300-3 6-meter converter was acquired to go along with the SBA-300-4 2-meter converter on my SB-301 receiver. The receiver is going through restoration. It has worked well for over 55 years. Perhaps that will be a future article?

I also have an SB-614 solid-state monitor scope that I need to get working. It would make a good article.

73, from AF6C



Notes:

1. Heathkit of the Month #120 CI-1020 Automotive Timing Light:
https://www.w6ze.org/Heathkit/Heathkit_120_CI1020.pdf
2. Heathkit of the Month #73 ID-29 Automotive Tune-Up Meter:
https://www.w6ze.org/Heathkit/Heathkit_073_ID29.pdf
3. The order of Heathkit catalogs over a full year usually goes: Winter, Spring, Summer, Fall, and Christmas.
4. #53 lamp - 14.4V 0.12A miniature bayonet (BA9s).
5. Heath recommends you use a soft cloth on your workbench to prevent scratching the meter face.
6. The 3-conductor cord attaches to the circuit board with the ribbed lead to hole C, the center lead to hold B and the other lead to hole A.
7. The 2-conductor cord attaches to the circuit board with the ribbed lead to hole E and the other lead to hole D.
8. 1N4732A Zener Diode, 4.7 volts, 1 watt (0.21 A max).
9. ECS - Emission Control System.

Notes for HotM #123 (CI-10801) 5/2024

Remember, if you are getting rid of any old Heathkit Manuals or Catalogs, please pass them along to me for my research.

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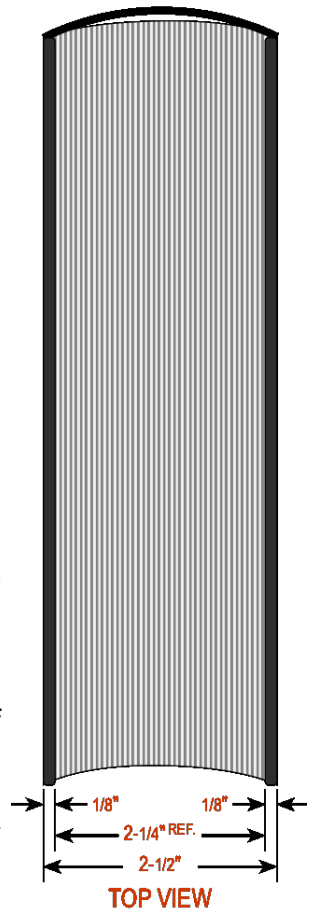
Thanks - AF6C



The Bookworm Puzzle:

In February, Carl received a three volume set of manuals from the ARRL. He carefully, and proudly, placed them neatly on display on his bookshelf section dedicated to ham radio. He planned to start reading Volume I within the next few days.

Unfortunately, life got in the way, and he didn't get to start reading for over two months. When he took down the first volume, he was horrified to find a bookworm had been hiding just inside the front cover of Volume I. Examining the other volumes he found the book worm had eaten her way from inside the front cover of Volume I, all the way to the inside back cover of Volume III.

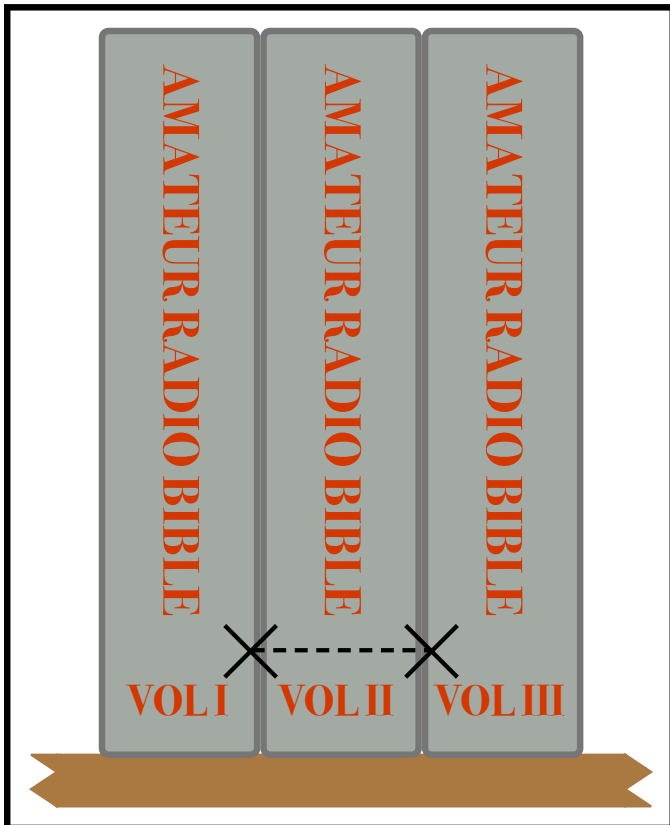


If each volume is $2\frac{1}{2}$ " thick including covers, and the front and back volume covers are each $\frac{1}{8}$ " thick, how many inches did the book-worm eat through?

The Bookworm Puzzle Answered:

The bookworm traveled $2\frac{3}{4}$ " to get from the inside front cover of Volume I to the inside rear cover of Volume III. There is no 'trick' to the puzzle. The books were placed on the shelf in normal fashion, Volume I on the left, Volume II in the middle and Volume III on the right. All the books are upright, with the binding facing outward.

What is usually forgotten is that, when the books are so arranged, the front cover of each Volume is to the right and the back cover is to the left. Thus the worm ate through front cover of Volume I ($\frac{1}{8}$ "); she then ate through all of Volume II ($2\frac{1}{2}$ "); and then ate through the back cover of Volume III ($\frac{1}{8}$ ") to end up inside the back cover of VOLUME III.



The common answer people give is $7\frac{1}{4}$ " because they assume the front is to the left and the rear is to the right.

As of this writing, we've had three people respond. Two chose the $7\frac{1}{4}$ " answer but Fried - WA6WZO got the correct answer. Thank you for those few who submitted answers.

As a reward to Fried, there will be a May Puzzler; one Fried offered for the newsletter. It is a real puzzle, and one you can fool with in your spare time. All you need to solve it is the ability to multiply and lots of patience!

73, from AF6C



Here's The Puzzler Fried - WA6WZO calls his favorite super puzzle. Can YOU find the two 3-digit numbers that meet the requirements?

A 3-digit number times a 3-digit number with three partial products of 3-digit numbers each, and giving a 5-digit product. Note, the total number of digits used is 20. Can you replace each X with a digit and meet the goal that each of the digits (0 – 9) are used only twice?

$$\begin{array}{r} \text{XXX} \\ \text{XXX} \\ \text{XXX} \\ \text{XXX} \\ \text{XXX} \\ \hline \text{XXXXX} \end{array}$$

Remember, each digit (0-9) must appear exactly twice.

Instead of giving the answer next month. A further clue will be given each month, perhaps by revealing a pair of numbers, until someone solves the puzzle. Send your answer to:

puzzler@w6ze.org

Remember, there is one, and only one, possible answer.



Arnie N6HC and Tim N6GP Go Back to School at Cal State Fullerton

by Tim Goeppinger, N6GP

It all started on February 28, when Ken Konechy, W6HHC received a call from Cal State Fullerton professor Robert Quezada asking if anyone in our club could do a demonstration of morse code for two of his History of American Mass Communication classes on March 20. Ken wrote an email about this request to the OCARC Board, and we began to search for someone who could make this happen. One local expert in morse code was contacted, but he was unable to do it. Another one of our members was interested, but the March 20 date did not work for him either. Finally on March 12, Arnie Shatz, N6HC and Tim Goeppinger N6GP volunteered for the demo.

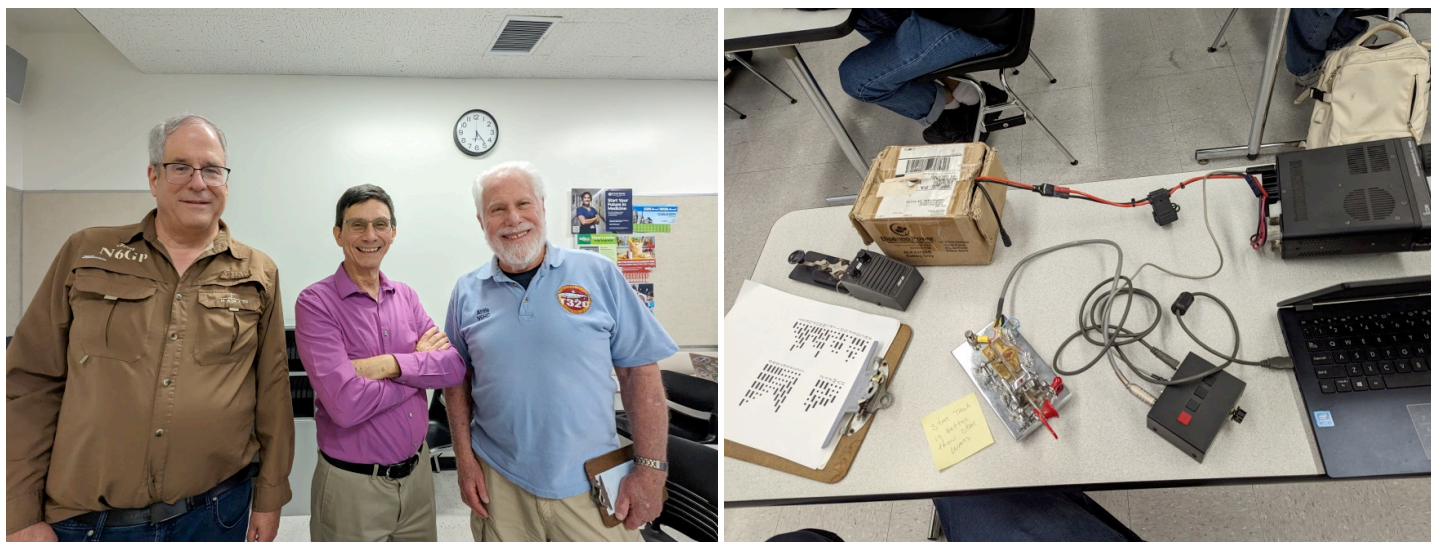


The beautiful weather highlighting some of the modern buildings at Cal State Fullerton

Many telephone calls and emails were exchanged with Mr. Quezada about what he wanted us to present, the length of the presentation in each class, which was 30 minutes, and other details. Originally he was requesting us to bring vintage radios in from the 1970's and 80's, but they talked him out of it. One interesting part of the preparing for this day was to arrange for parking. He asked for the license plate number and make and model of the car we were going to park there. This was to arrange a parking permit for the Faculty Lot. The permit system is fully automated. License plates are periodically scanned by patrols in the lots to see if they belong there. Arnie & Tim thought this was impressive.

Tim immediately started re-reading his copy of *The Victorian Internet – The Remarkable Story of the Telegraph and the Nineteenth Century's On-line Pioneers* (Tom Standish). He was particularly fascinated by Napoleon's visual telegraph system used in the 1790's. Arnie was tasked to select some photos of some of his DXpeditions, and other slides relating to CW. One single Powerpoint presentation was merged together.

An old MFJ 557 Code Practice Oscillator was found for this demo. A very clever setup was devised by Tim: his IC-7000 transceiver would transmit on 2 meter CW with a few watts. Across the room would be his laptop with a SDRPlay RSP-1a SDR receiver connected. This setup was tested at Arnie's house the Monday before the demo. Tim kept failing at sending something simple in CW, even his callsign. The N6GP kept turning out as N6GD. Something was really wrong! He tried again. "What is the problem?" he said. Turns out there is 1 second of processing delay in the DSP receiver. Hearing the CW delayed by 1 second made it impossible to send. So, the SDR idea was scrapped, and the sidetone of the IC-7000 was used for the demo.



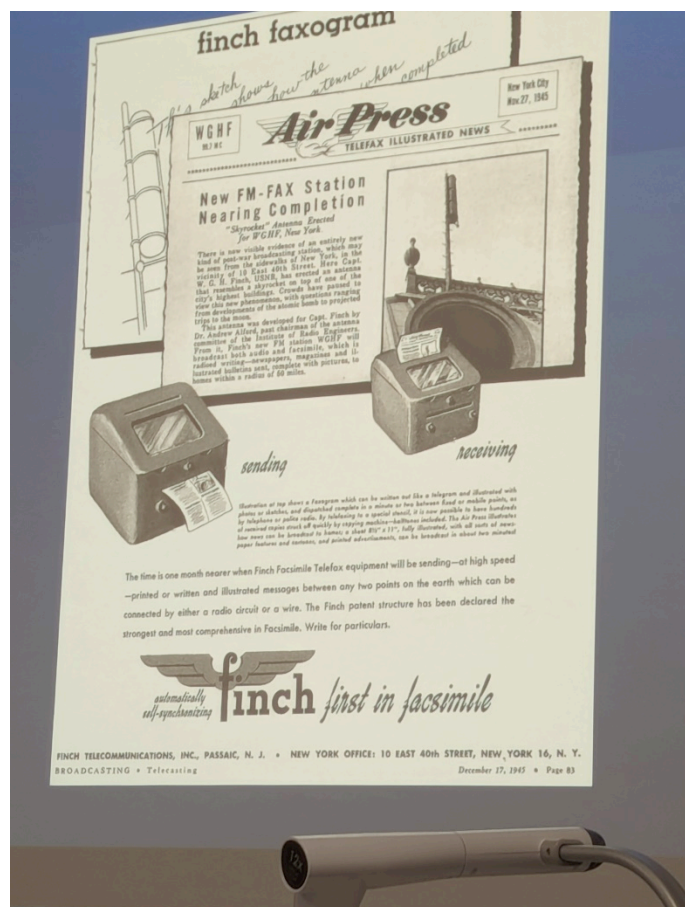
Tim N6GP, Prof. Robert Quezada & Arnie N6HC CW Demo setup – IC-7000, laptop, keys etc

The big day of March 20th arrived. Arnie and Tim met Robert Quezada in one of the buildings near the parking lot and we crossed the street to where his classroom is located. They were able to set up for the demo with time to spare, before the class start at 1PM. This classroom was fairly large, and there were about 30 students in attendance. Mr. Quezada gave a very interesting lecture at the beginning of the class until about 1:40, when the demo was to begin. Tim gave a quick lecture on what Amateur Radio is, and how it differs from Commercial Radio. Arnie followed with a brief talk about DXpeditions. They showed some videos showing what a pileup sounds like in both SSB and CW, and finished off with the legendary video of the Jay Leno Show where Chip Margelli, K7JA and Ken Miller, K6CTW beat the texting kids with CW.

Arnie and Tim decided beforehand that they would not repeat a texting vs CW contest as part of this demo, because they knew that the new QWERTY keyboards on smart phones would beat their CW. They acquiesced when Mr. Quezada suggested "Wouldn't it be fun to repeat this competition in my classroom?" Tim was the sender, and Arnie received the code, and wrote on the blackboard. Two students were selected to text one to the other. The professor scribbled out the text to be sent on Sticky Notes, and handed it to each team. N6GP tried to send about 30 WPM or more, but ended up making a lot of mistakes. The texting team successfully sent the message "STAR TREK IS BETTER THAN STAR WARS", and not surprisingly won the competition.

It truly was a day back in school for Arnie and Tim, because they had to sit through over one hour of lectures during these two classes. They did not mind a bit, because Mr. Quezada is gives engaging

lectures on mass communications. They actually learned a lot of things about radio that they had never heard before. For example: the Finch Facsimile system, invented in the 1930's. The newspapers had felt threatened by the disruptive technology of radio, whose listeners were using it as their new source for news. William Finch came up with his radio FAX system where small pages of newspaper were transmitted overnight into people's homes. Each page took 20 minutes to transmit, and were printed on thermal printers. This system died out in a few years, because of the cost of the printer paper, and the fact that the consumers never really asked for it in the first place.



Sample of the Finch Facsimile Newspaper

Tim and Arnie had almost 2 hours to kill between the classes, so they decided to walk around campus a bit to see what was there. They were both struck by how large the campus is, and how you really don't grasp the size of it when you drive by on the 57 freeway. They stopped at the main library, and then the bookstore, which is impressive. Unlike during Tim's time at Cal Poly Pomona, most campuses now feature a large food court with all kinds of restaurants like Carl's Jr, Panda Express and Baja Fresh. Tim took some time to re-edit his presentation a bit, to provide more focus on the issues of morse code and Amateur Radio.

They met up again with Mr. Quezada at a different building than the first class. This classroom was extremely small, and the class had only about 10 students. Robert Quezada presented a different lecture than before, which kept the interest level up for N6HC and N6GP. They did their presentation as before and challenged the students to a morse code vs texting race again. The message this time was

"ALL WE HEAR IS RADIO GOO GOO, RADIO GA GA", a lyric from the Queen song "Radio Ga Ga", which was played earlier during the lecture. This time Arnie was sending and Tim copied the CW at the white board. Tim got about half the letters, and the texters won again. This second class was 2 ½ hours long, so we had a bit more time with the students. We had a chart of the morse code letters, and we had the students send their names. One woman seemed to be a natural at sending CW, and she had a really "good fist."

Arnie's comment about the day was "Both classes seemed to enjoy the presentation and demonstration. They asked many questions about amateur radio and Morse code. They were fascinated with the miniaturization of the transceiver and the different code keys. I hope we piqued some interest in amateur radio and membership in our radio club. We certainly need more young and intelligent individuals to perpetuate our beloved hobby." Tim said "We will know if we succeeded with this demo if we get a call back to do it again next semester. Time will tell."

General Meeting Minutes

April 2024

General Meeting April 19th, 2024

President Nicholas Haban, AF6CF start the meeting promptly and proceeded with the Pledge of Allegiance followed by guest and visitor introductions.

Our VP Janet KL7MF introduced this evening's speaker, Dick Norton, N6AA.

Dick's presentation was on the state of ARRL. Topics covered include Organizational Structure, Financial Status, Board Structure, Management & Board Relations, and Impact to Members. A question and answer period was provided at the end.



After a short break the meeting continued with club business.

Board Meeting

A majority of board members were in attendance.

President asked for a discussion of how club should handle large value donations. Auction items, offer for a prize, sell directly to interested parties. Can the items be used to encourage more member attendance at meetings?

Offering VE License Testing Exams. The West Coast Amateur Radio Club is shutting down and we were asked if we would consider taking up the task of holding the exams that they formerly offered. Dan KI6X stated that to his contact at Red Cross believes we would be approved for building access an hour prior to our General Meeting time. Janet will contact Ken Simpson about acting as an organizer.

VP Report – next month's speaker is Ron Wilcox, KF7ZN. Presentation "A Visit to the Sun and the Ionosphere."

Membership Report – 84 members. Member Fried Heyn, WA6WZO left a donation of a sheet of Amateur Radio postal stamps from the 1960's.

Field Day Chairman Report – Field Day site is moved to a school that is about ½ mile north of usual location. Bonus points are important and hope to focus on GOTA station points in particular. Food supply, we maybe purchasing food for Saturday night dinner. Stone Fire Grill is one possibility for that meal. Looking to budget \$600 towards food and incident expenses with additional cost covered by member donations. Motion to budget \$600. The motion passed.

Motion to Adjourn – made, seconded, and passed at 9:25 PM.



Treasurer's Report

May 2024

Cash Flow

1/1/2024 through 5/1/2024

Category	1/1/2024- 5/1/2024
INFLOWS	
Badge Income	3.00
Dues, Membership (Paypal) 2024	1,213.46
Dues, Membership 2024	410.01
Opportunity Drawing -Monthly	63.00
TOTAL INFLOWS	1,689.47
OUTFLOWS	
Flowers Expense	50.00
Guest Speaker Meal - Exp	108.00
Historian Expenses	74.24
PayPal Fee	62.66
Refreshments Expense	35.93
Web Site Hosting	100.00
WFD - Food	62.91
WFD - Propane	40.85
WFD Flowers	34.00
WFD Rental - Tent	170.00
TOTAL OUTFLOWS	738.59
OVERALL TOTAL	950.88

The **ORANGE COUNTY AMATEUR RADIO CLUB, INC.**

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